

January 22, 2021

BY ELECTRONIC FILING

Marlene H. Dortch
Secretary
Federal Communications Commission
45 L Street, N.E.
Washington, DC 20554

Re: *IBFS File No. SAT-MOD-20200417-00037; RM-11855*

Dear Ms. Dortch:

This is to inform you that on January 20, 21, and 22, 2021, David Goldman from Space Exploration Holdings, LLC ("SpaceX") had calls with Ben Arden from Commissioner Carr's office, Bill Davenport from Commissioner Starks's office, and Erin Boone from Commissioner Simington's office, respectively, to discuss SpaceX's proposed modification to lower its satellites to safer operating altitudes. The call with Erin Boone also included a discussion of SpaceX's proposal to update the Commission's rules for sharing spectrum among non-geostationary orbit ("NGSO") systems operating Fixed Satellite Services ("FSS").

SpaceX explained how its modification is designed to improve its debris profile. SpaceX's modification would lower its NGSO system's: (1) altitude, (2) power levels, and (3) elevation angles. Taken together, these changes ensure that SpaceX will be able to achieve the advantages of lower altitudes without causing a significant increase in interference to other NGSO systems in its processing round. And although Amazon is not entitled to the additional spectrum rights it attempts to claim for itself, even if it were, the modification still would not increase interference for its still nascent plans. As demonstrated in the attached presentation (Attachment A), potential competitors only reach contrary conclusions by cherry picking data and ignoring the majority of the modification.

SpaceX continues its rapid deployment of its next-generation satellite system and is already bringing high-throughput, low-latency broadband service to otherwise unserved Americans across the country. To ensure that this much needed service is not delayed, SpaceX urges the Commission to expeditiously grant the application.

Marlene H. Dortch
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Sincerely,

/s/ David Goldman

David Goldman
Director of Satellite Policy

SPACE EXPLORATION TECHNOLOGIES CORP.
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Attachment

Cc: Ben Arden
Bill Davenport
Erin Boone



January 2021

SPACEX

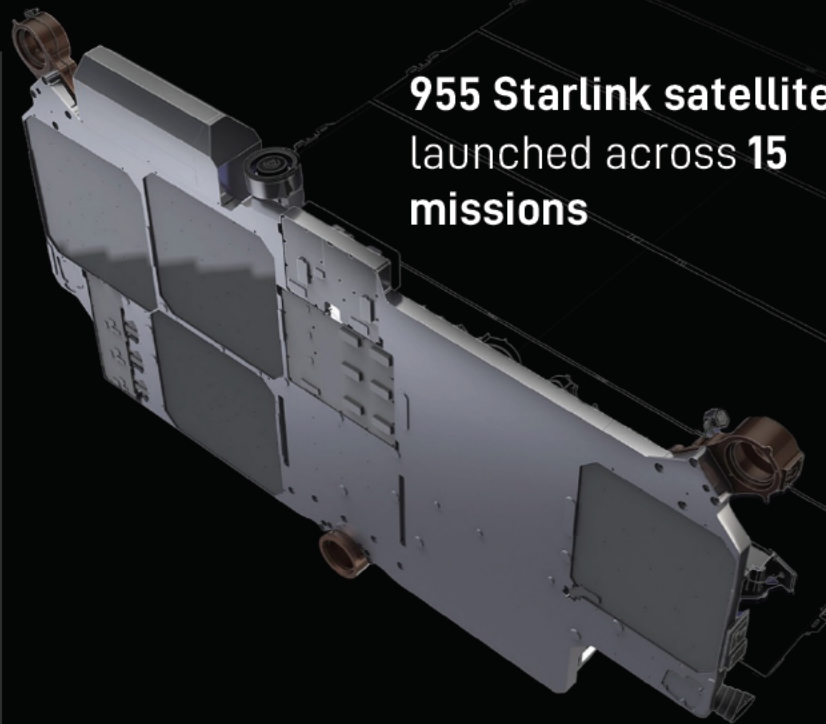
STARLINK MODIFICATION



Starlink Global Connectivity

- High-speed, low latency broadband:
 - 100 Mbps (current) to 10 Gbps (future) downlink to user
 - <30 ms round trip latency to internet for most users
- Resilient and redundant:
 - Focus on quality and availability through path diversity and multiple routing options to every Starlink and Gateway
 - Rapidly deployable to facilitate end users access to broadband
- Continuous improvement:
 - Building to launching 120 satellites per month
 - Ongoing software upgrades to accelerate throughput
- Responsible operation:
 - Lowest altitude LEO system w/ autonomous collision avoidance
 - Commitment to keeping space clean

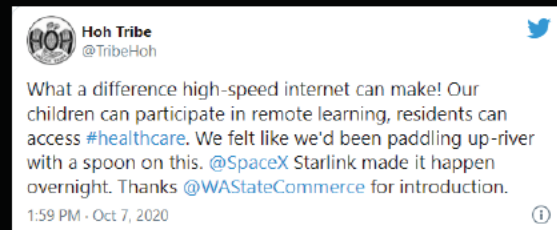
**955 Starlink satellites
launched across 15
missions**



Starlink Deployment Status

- Public beta service underway - direct-to-consumers across multiple U.S. states now
- Providing service to previously un/underserved households and students in rural areas
- Prices on par or better than existing options in rural/remote areas
- No contracts; no early termination fees; no data caps
- Prioritizing emergency responders & locations with no Internet connectivity

"Remote tribe says SpaceX Starlink "catapulted" them into 21st century"



ECISD becomes first school District to utilize SpaceX satellites to provide Internet for students

Completing Safety Upgrade

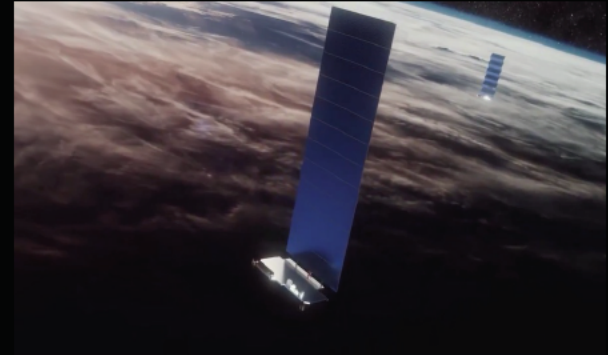
FCC found in 2019 that operating half of SpaceX's system at lower altitudes would **"allow SpaceX to make efficient use of valuable spectrum resources more safely, quickly, and cost-effectively as it initiates a new generation of broadband services available to customers worldwide, including those in areas previously underserved or even totally unserved by other broadband solutions."**

SpaceX's reduction in satellites was a **"a fundamental element in assessing whether there would be significant interference problems as a result of granting the proposed modification."**

- Non-controversial; Approved at staff level
- No opposition from Amazon, Viasat, Dish, RS Access

To take full advantage of these benefits, SpaceX applied in April 2020 to complete its safety upgrade by operating the rest of its satellites at 540-570 km.

- Operating at this lower orbit is more difficult and more costly.
- SpaceX invested in the capabilities so it could improve the sustainability of space.



No Significant Increase in Interference

Modification would:

- Lower the operational altitude of the satellites
- Lower the power level
- Lower the elevation angle

Taken together, these three elements ensure no increased interference to other operators



SpaceX Commitments:

- Accept interference into uplink
- Won't operate > 580 km once Amazon reaches phase IV (launched >1800 satellites)
- Non-interference for first polar sats
- Perform all avoidance maneuvers for first polar sats

Ongoing Commitment to Space Safety

Safe by Design:

- Fully demisable satellite design; effectively burns up on re-entry
- Minimizes calculated risk to life on the ground
- Insert at extremely low altitudes, meaning any early failures demise within weeks
- Improves environmental impact from current authorization
- Architect orbit raising trajectories that avoid ISS and thoroughly coordinate launches in orbits near ISS and that could conjoin with ISS visiting vehicles

Transparent operations:

- Non-maneuverable satellites marked on space-track.org, which is available to all satellite operators
- Publish propagated satellite ephemeris on Space-Track with covariance and encouraging others to do the same

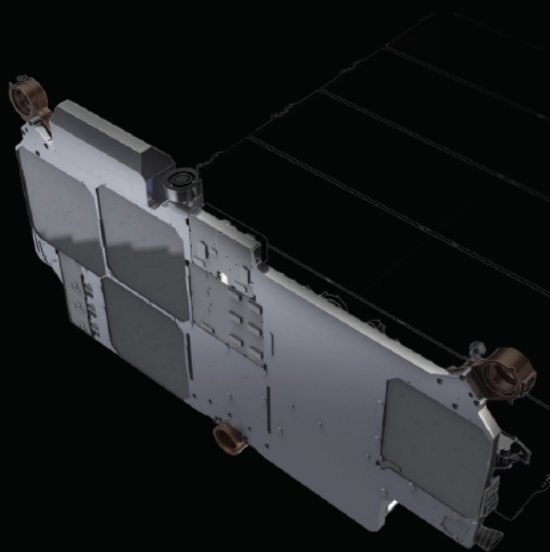
Working closely with:

- *NASA*: Space Act Agreement to formalize and document close coordination ensuring safe operations near NASA satellites, ISS and visiting vehicles
- *18 SPCS*: Cooperative Research and Development Agreement (CRADA) to improve coordination and synergy
- *European Space Agency*

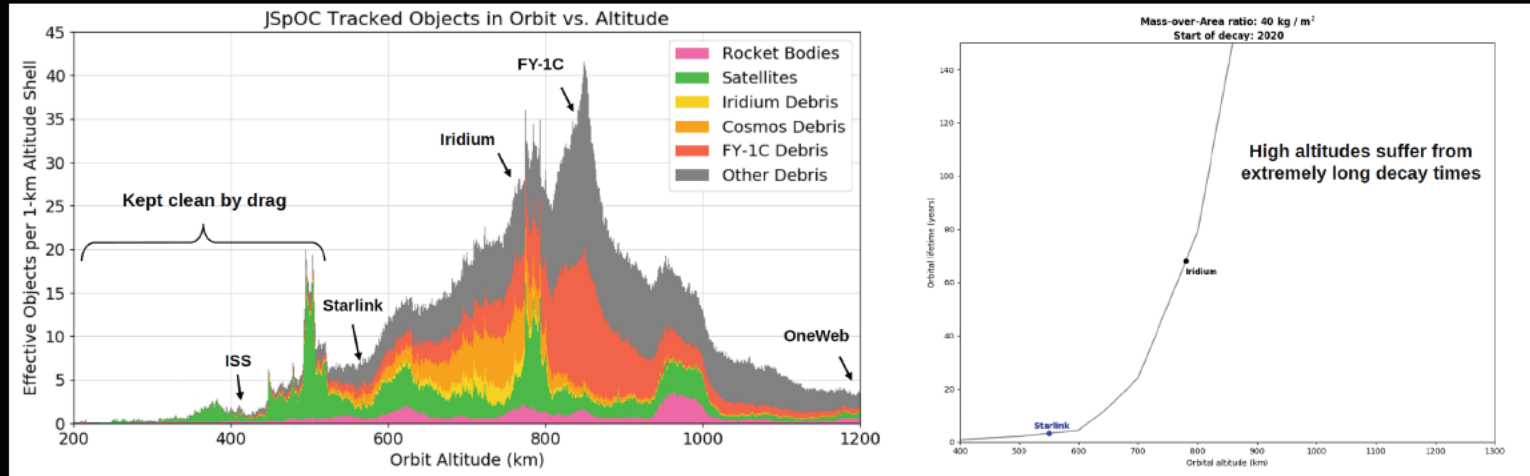
Viasat's allegations are "inexplicable"

Viasat has made filings "suggesting that the SpaceX Starlink satellites have a 7 percent failure rate. This is a misreading of my results. They appear to be counting satellites which have been deliberately removed from orbit as 'failed' – *an inexplicable interpretation.*"—Jonathan McDowell, Center for Astrophysics, Harvard & Smithsonian (emphasis added)

"Lowering the orbital altitudes of low-Earth orbit satellites to 600 km or less is one strategy to reduce interference with ground-based optical astronomy"—American Astronomical Society



Passive Decay Times



- Starlink altitude between 540-570km results in significant improvement in space safety due to higher drag
- Passive decay time lowers from >200 years to ~5 years
- SpaceX has implemented automated conjunction avoidance
- SpaceX continuously improves satellite reliability

Safety vs Spectrum: A False and Dangerous Choice

Despite safety benefits, competitors demand that SpaceX must sacrifice spectrum access if it wishes to fly at lower altitudes.

- To reach misleading claims of interference, competitors cherry pick data and ignore the true changes in the modification
- Amazon argues that SpaceX must allow Amazon to harm SpaceX's existing operations
- Contrary to Commission precedent and license conditions
 - **NO** instance in more than two decades where Commission interpreted the law as Amazon suggests
- Would undermines processing rounds
- Would deter efforts to improve safety
 - Systems cannot upgrade unless they can protect all first and second round systems, including 30k sats from SpaceX
- Would harm consumers by limiting throughput



Modification Does Not Cause Significant Increased Interference

Modification :

- Lower the operational altitude of the satellites
- Lower the satellite downlink power level
- Lower the **minimum** elevation angle

Taken together, these three elements maintain equivalent interference environment to other operators

Misleading and false interference showings:

- Interference showings from competitors only include elevation angles
- Competitors routinely ignore:
 - lower power levels
 - lower operational altitudes

Competitors' analyses misrepresent the true results from the modification

Amazon's Attempts to Stifle Competition

Since being granted its own “license,” Amazon has engaged in continuous campaign to undermine authorizations from competitors

Amazon lacks standing because its system is not authorized to launch

Debris Mitigation: Demands *exclusive access* to orbits

Failed to submit required debris mitigation plan. No plan to safely raise or lower through already-licensed systems

- SpaceX agreed to limit its operation—Amazon offers *nothing*
- *Anti-competitive:* Demands exclusive access to orbits, even if it never launches a single satellite

Interference Protection: Unprecedented demands

- *Failed to submit required interference protection plan.*
- Amazon now claims that *Amazon*—and no other second round system—should receive protection from earlier round systems

Amazon's Increased Interference to SpaceX
Analysis Provided by Amazon

	Gateways	Users
Initial SpaceX deployment	> 50%	~25%
Full SpaceX deployment	> 40%	~40%

Amazon's proposal for “equal footing”
harms SpaceX/unserved customers

Path of Obstruction:

30 meetings to oppose SpaceX

NO meetings to authorize its own system

MVDDS Proposal Has Nothing to do with SpaceX's Modification

